Chapter 5: Land Use

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Upper Landing Park.
Photo credit: Camelia Manring

Land use is a general term that refers to "human activities on land which are directly related to the land" (Clawson, 1965). Land use includes the stewardship of natural landscapes such as forested and wetland areas, as well as the regulation and management of developed areas, including residential, commercial, and industrial sites. Some examples of land use management that have implications for natural resources are zoning, surveying, real property tax regulations, and conservation efforts. This chapter explores and identifies current land use in the City of Poughkeepsie and looks closely at status and management of the urban forests.

Zoning

The City of Poughkeepsie implements zoning regulations intended to promote public health, safety, and general welfare of its inhabitants.

Section 19.1-2 of the City's zoning code elaborates on the key purposes of local land use regulations, explaining that the zoning code is in place to ensure "the continued viability and improvement of the City's residential environment and economy and the assurance of adequate and necessary sites for a full range of residential, industrial, commercial, recreational, open space and public and quasi-public uses reflecting local and appropriate regional needs." (1979 City of Poughkeepsie Zoning Ordinance)

From "residential" and "commercial" uses to "recreational" and "public" uses, the City of Poughkeepsie's zoning code exists for the improvement, management, and protection of the City's land and inhabitants, fulfilling its purpose through a series of specific regulatory standards. These standards are applied to different zones throughout the City designated for specific types of land uses.

Based on the current zoning map (City of Poughkeepsie Zoning Districts, 2017), there are 24 different zoning districts in the City of Poughkeepsie (Table 5.1). A copy of the zoning map is provided in Appendix G. In general, commercial use is permitted in the C zones, industrial use is permitted in the I zones, residential use is permitted in the R zones, and other uses are permitted in various other zones designated below.

Table 5.1. Zoning Districts in the City of Poughkeepsie

Zoning District (Abbr.)	Zoning District Name
C-1	NEIGHBORHOOD COMMERCIAL
C-2	RESEARCH AND DEVELOPMENT
C-2A	MAIN STREET COMMERCIAL
C-3	GENERAL COMMERCIAL
H-M	HOSPITAL MEDICAL
I-1	LIGHT INDUSTRIAL
I-2	GENERAL INDUSTRIAL
O-R	OFFICE RESIDENTIAL
PRD	PLANNED RESIDENTIAL DEVELOPMENT
R-1	LOW-DENSITY RESIDENCE
R-2	MEDIUM LOW-DENSITY RESIDENTIAL
R-2A	CENTRAL LOW DENSITY
R-3	MEDIUM-DENSITY RESIDENCE
R-3A	CENTRAL MEDIUM DENSITY RESIDENTIAL
R-4	MEDIUM HIGH-DENSITY RESIDENTIAL
R-4A	CENTRAL URBAN DENSITY RESIDENTIAL
R-5	HIGH-DENSITY RESIDENCE DISTRICT
R-6	URBAN DENSITY RESIDENCE
R-D	RESEARCH & DEVELOPMENT
W	WATERFRONT
WTOD	WATERFRONT TRANSIT ORIENTED DEVELOPMENT
G-OM	OFFICE MANUFACTURING
G-CM	MIXED-USE COMMERCIAL
G-RM	MIXED-USE RESIDENTIAL

Residential districts comprise about one third (> 1,000 acres) of the City's approximately 3,300 acres of land area (i.e., excluding the Hudson River). This represents the largest zoned use in the City compared to commercial, industrial, and other uses.

Since permitted land uses in different districts may have different impacts to natural resources or provide different opportunities for natural resource management and conservation, the location and extent of the districts indicate where those potential impacts and opportunities are present. City managers may wish to implement zoning regulations that incorporate mitigation and conservation strategies specific to uses within each district. For example, several industrial and commercial districts are located along the Fall Kill. Permitted uses within these districts may impact water quality in the creek from point or non-point source pollution. Therefore, Poughkeepsie officials may wish to require any new developments in these districts to implement management strategies and/or specific techniques to remove or mitigate their impacts to the creek.

Land Use

Map 5.1 illustrates the different land uses in the City of Poughkeepsie using real property tax assessment information for each land "parcel." The City of Poughkeepsie's assessor classifies the use of each parcel based on the New York State Department of Taxation and Finance property type classification codes (New York State Department of Taxation and Finance, 2018).

Many specific classification codes are provided in the New York State Assessor's Manual and used by the City's assessor to classify the uses of all the properties in the City as part of assessing their real property value. For the purpose of Map 5.1, the land uses were condensed into broader categories. For example, properties with the assessed land use classes for one-, two-, and three-family residences, and larger multi-unit residences are all represented in the map simply as "residential". Since the assessor's purpose in classifying properties is to ensure that land can be taxed appropriately, it is not necessarily suitable for land management or other natural resource management purposes. However, it does illustrate the general distribution of land uses across the City and reveals some land uses patterns in specific areas.

For example, land uses south of the eastbound US-44/NY-55 arterial and east of US-9 are largely residential. A commercial corridor is present along Main Street, between the east and westbound US-44/NY-55 arterial. The pattern of land use north of the westbound US-44/NY-55 arterial and west of US-9 is comprised of a heterogeneous mix of residential, commercial, industrial and other uses.

While those general patterns are not likely to change in the near future, there has been an increase in development as the City undergoes revitalization efforts, which will convert the uses of some individual properties over time as projects are completed. Map 5.1 (Table 5.3) includes sites that are in the process of or have been approved for development, based on information obtained from the City of Poughkeepsie (Quinn, 2019). For the most up-to-date information, please contact the city planning office using the contact information at http://cityofpoughkeepsie.com/building.

Table 5.2 Current development projects in the City of Poughkeepsie (Quinn, 2019)

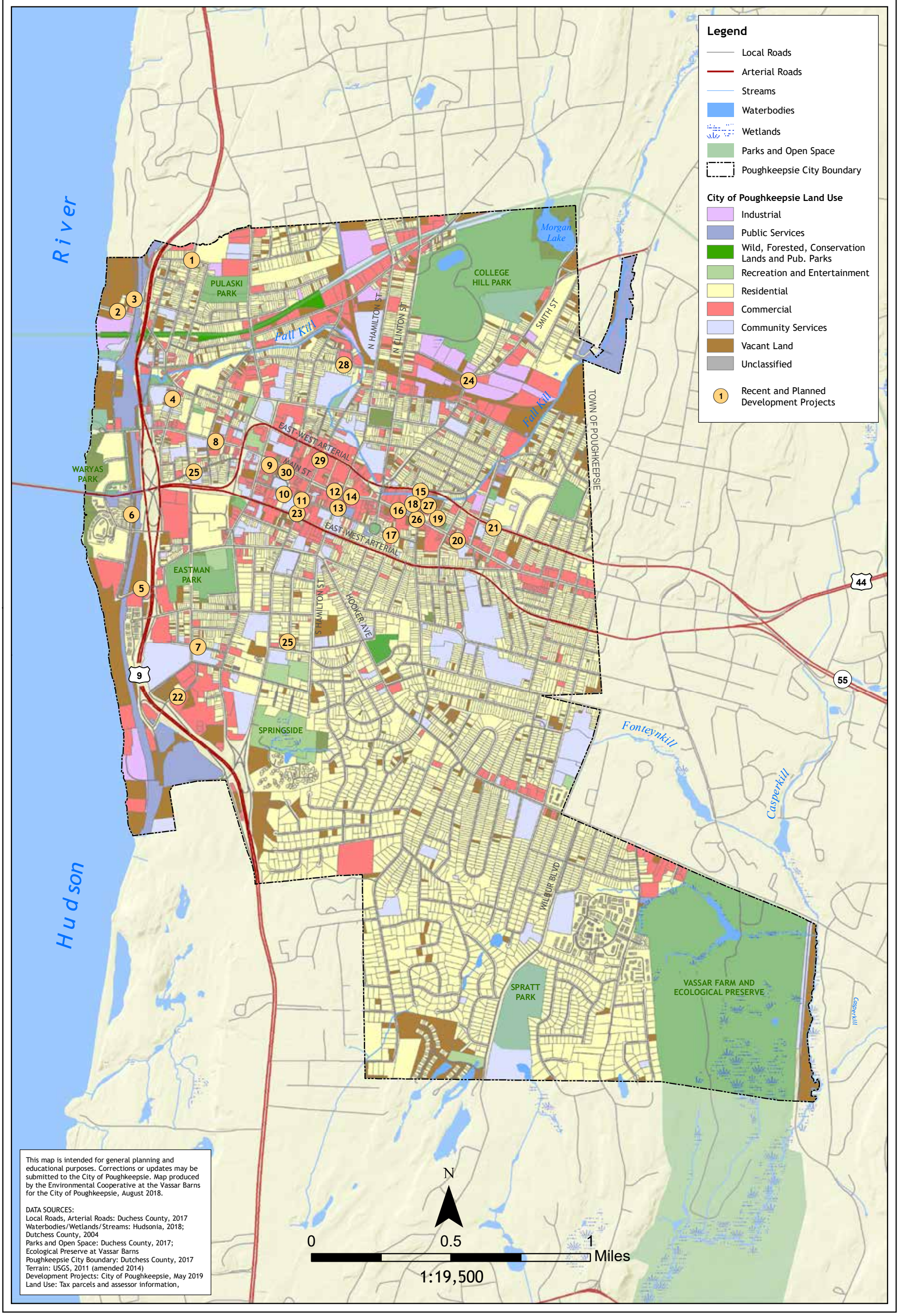
Map Key #	Project Name	Address	Residential Units	Commercial (sf)	Status
1	North Point Centre	Delafield and Spruce St	18	12,000	Under Construction
2	One Dutchess Avenue	One Dutchess Avenue	300	13,800	Under Construction
3	141 N Water St	141 N. Water Street	15	-	Approved site plan
4	Pelton Manor	36 N. Clover Street	44	-	Planning Board
5	Water Club	36 Pine Street	136	-	Completed
6	Poughkeep-sie Landing (DeLaval)	Rinaldi Blvd	50	30,000	Pre-planning
7	Vassar Hospital Expansion	Reade Place	-	752,000	Under Construction
8	Queen City Lofts	178 Main Street	70	12,000	Under Construction
9	Up to Date	278-282 Main Street	19	11,000	Pre-planning
10	40 Cannon (Cardinal Court)	40-44 Cannon Street	49	7,000	Completed
11	23 Academy/77 Cannon	23 Academy/77 Cannon	30	6,000	Planning Board
12	387 Main Street	387 Main Street	22	4,200	Approved site plan
13	12 S. Hamilton	12 S. Hamil-ton Street	9	2,100	Completed
14	407 Main Street	407 Main Street	14	3,000	Under Construction
15	400 Maple Street	400 Maple Street	20	1,500	Under Construction
16	Trolley Barn Redevelopment	489 Main Street	1	28,000	Under Construction

17	148 Cannon Street	148 Cannon Street	13	-	Planning Board
18	Poughkeepsie Underwear Factory	8 N. Cherry Street	15	7,000	Completed
19	Fallkill Commons on Rose	Rose Street	78	-	Under Construction
20	560-564 Main street	560-564 Main Street	20	2,300	Approved site plan
21	Heart of the Block (Maple Street)	Maple Street	40	-	Under Construction
22	Marist Health Quest School of Medicine	Fox Street	-	100,000	Pre-planning
23	The Hive	33-35 Academy Street	28	24,000	Approved site plan
24	MPI Expansion	165 Smith Street	-	10,000	Approved site plan
25	84-86 Carroll Street	84-86 Carroll Street	16	-	Approved site plan
25	160 Union Street	160 Union Street	41		Planning Board
26	508-516 Main Street	508-516 Main Street	60		Common Council for Rezone
27	Cigar Factory	15 N. Cherry Street	40		Conceptual
28	27 High Street	27 High Street	60	-	Pre-planning
29	Crannell Square	35 Catharine Street	75		Planning Board
30	289 Main Street	289 Main Street	6	5,700	Planning Board

Map 5.1 Land use in the City of Poughkeepsie

City of Poughkeepsie Land Use

City of Poughkeepsie, New York



Brownfields

A brownfield is an abandoned, idled, or underused industrial or commercial property whose redevelopment may be complicated by the presence or potential presence of contamination (US Environmental Protection Agency, 2018). Sources of environmental contamination at brownfields are often associated with former industrial and commercial operations involving the use or disposal of hazardous materials. In some cases, former uses at brownfields predate modern environmental laws regulating the handling, storage, and disposal of hazardous substances. Contamination at brownfields may also be the result of outdated, malfunctioning, or poorly-maintained equipment, leaking petroleum or chemical bulk storage tanks, accidental spills, improper handling of equipment and materials, or intentional dumping or on-site disposal of materials. Based on the anticipated use of the property, some contamination may remain at brownfields after remediation. These sites must have engineering controls (e.g., soil capping, subsurface venting systems, mitigation barriers, fences) and institutional controls (e.g., use restrictions, environmental easements) that are designed to prevent human exposure to contaminants.

Like many other former manufacturing and commercial centers in the northeastern US, Poughkeepsie contains several properties that may be considered brownfields due to their former industrial and commercial use and the presence or potential presence of environmental contamination. Some of these sites have been remediated through various programs implemented by New York State Department of Environmental Conservation (NYSDEC).

The U.S. Environmental Protection Agency (USEPA) and NYSDEC implement several environmental cleanup and brownfields programs to remediate contaminated sites and encourage their redevelopment. Abandoned hazardous waste sites placed on the federal National Priorities List (NPL) are eligible for remediation under the Superfund Program. NYSDEC implements environmental cleanup and brownfields programs on properties where a contaminant is present at levels exceeding the soil cleanup objectives or other health-based or environmental standards, criteria or guidance.

The City of Poughkeepsie contains 17 sites managed under the following NYSDEC environmental cleanup and brownfields programs (New York State Department of Environmental Conservation, 2019):

- State Superfund Program
- Brownfield Cleanup Program
- Environmental Restoration Program
- Voluntary Cleanup Program

For more information about these programs, see the NYSDEC Environmental Cleanup & Brownfields website at http://www.dec.ny.gov/chemical/brownfields.html.

The remediation sites are given a "Site Class" based on their inclusion in the state Registry of Inactive Hazardous Waste Disposal Sites, or "Registry." Sites listed on the Registry are commonly said to be sites in the "State Superfund Program" and whose cleanup status is indicated by a Site Class of 1 through 5. Non-Registry sites are those that are being investigated and remediated in a brownfield program or other environmental remediation program and are not listed in the Registry. The cleanup status of Non-Registry sites is

indicated by a Site Class of A (Active), C (Completed), P (Potential), PR (Potential RCRA Corrective Action, and N (No Further Action at This Time).

There are two Registry sites in the State Superfund Program, classified as "2" (Table 5.3). The "2" Site Class is assigned to a site at which:

- the disposal of hazardous waste has been confirmed and the presence of such hazardous waste or its components or breakdown products represents a significant threat to public health or the environment; or
- hazardous waste disposal has not been confirmed, but the site has been listed on the Federal National Priorities List (NPL).

One of the two Registry sites in the City of Poughkeepsie is the Hudson River, part of the Hudson River PCB Sediments site that includes the entire river from Hudson Falls in Washington County, New York, to the Battery in New York City, and is also listed on the NPL.

Table 5.3 NYSDEC Environmantal Cleanup and Brownfields Sites in the City of Poughkeepsie

Site Name (link to the description on NYSDEC website)	NYSDEC Program	Site Class	Address
19, 21, & 23 Academy Street	Brownfield Cleanup Program	A	19, 21, & 23 Academy Street
400 Block Restoration Area	Environmental Restoration Program	C	413-441 Main St
A.C. Dutton Greenway City	Brownfield Cleanup Program	C	1 Dutchess Avenue
CH - Bayeaux Street Poughkeepsie MGP	State Superfund Program	C	Main Street and North Perry Street
CH - Laurel St. - Poughkeepsie MGP	Voluntary Cleanup Program	C	Laurel Street
CH - Water St. - Poughkeepsie MGP	Brownfield Cleanup Program	A	North Water Street
Former A.C. Dutton Lumber Yard	Brownfield Cleanup Program	C	1 Dutchess Avenue
Former City of Poughkeepsie Sewage Plant	Brownfield Cleanup Program	C	176 Rinaldi Boulevard
Former Hamilton Reproduction	Environmental Restoration Program	C	166-186 North Hamilton Street
HRH Lead Abatement Site	State Superfund Program	A	55 Garden Street
Hudson River PCB Sediments	State Superfund Program	2	Hudson River, Hudson Falls-NYC Battery
Hudson River Waterfront-DeLaval Property	Environmental Restoration Program	C	202-204 Rinaldi Blvd.
PURA -14 Property	Environmental Restoration Program	C	Pine Street
PURA-14 Site	Brownfield Cleanup Program	C	36 Pine Street
Qual Krom Site	Environmental Restoration Program	C	28 Orchard Place
Queen City Lofts	Brownfield Cleanup Program	C	178-188 Main Street and 11 South Bridge Street
Schatz Plant	State Superfund Program	2	70 Fairview Avenue

2 - Registry site / A – Active / C – Completed / N - No Further Action at This Time

Of the other 15 non-registry sites in the City of Poughkeepsie, three are designated Site Class A (active) sites and twelve are C (completed) (Table 5.3). Active sites are those in any of the state's programs where work is underway and not yet complete. Completed sites are those where remediation has been satisfactorily completed under one of the state's remedial programs. Sites classified as "No Further Action at this Time" may include sites deemed not warranted to place on the Registry; where conditions after initial waste removal did not require additional work; where the site was being addressed under another program; where remediation under a brownfield program was not completed; or where the site was withdrawn from the program. For more detailed descriptions of these classifications, see the NYSDEC Site Classification page at http://www.dec.ny.gov/chemical/8663.html.

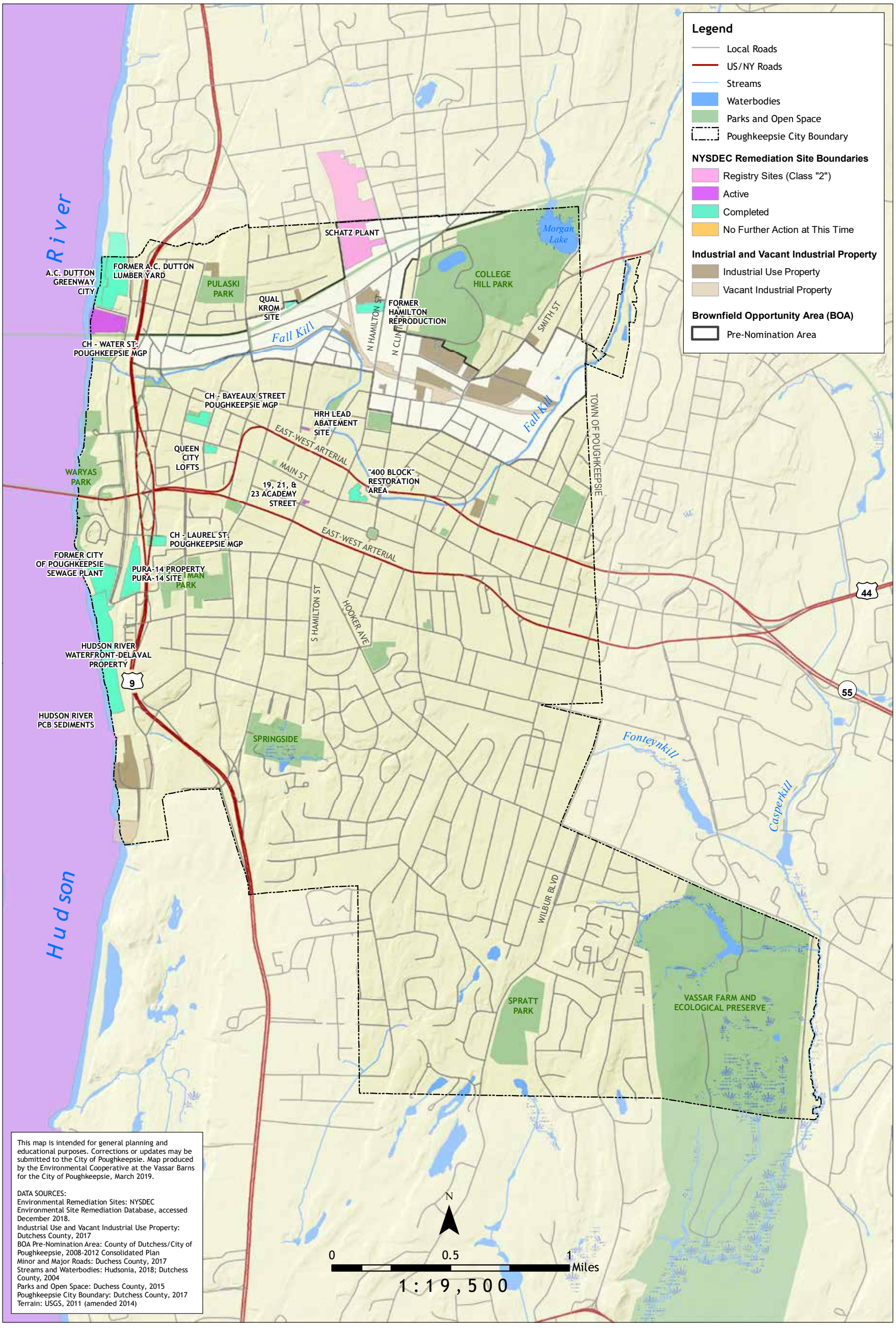
In addition to programs for owners and developers to incentivize the clean-up of individual brownfield sites, New York State also implements the Brownfield Opportunity Areas (BOA) Program through the Department of State (NYSDOS). This program provides communities with guidance, expertise and financial assistance to complete BOA Nomination Plans, which are revitalization strategies for neighborhoods or areas affected by brownfields or economic distress. A pre-nomination study was conducted for the City of Poughkeepsie, which outlined a historically industrial area in the northern portion of the City along sections of the Fall Kill Creek and a former rail line (County of Dutchess, City of Poughkeepsie, 2007). This area contains several industrial and vacant industrial properties based on tax parcel and assessment data obtained from Dutchess County. No further steps in the BOA nomination process have been completed nor are any currently planned (Hesse, 2019).

Map 5.2 includes the NYSDEC environmental remediation sites listed in Table 5.3, the above-mentioned BOA pre-nomination area, and the assessed industrial and vacant industrial properties in the City of Poughkeepsie.

Map 5.2 Brownfields in the City of Poughkeepsie

Brownfields

City of Poughkeepsie, New York



Urban Canopy Cover

Urban canopy cover describes the area covered by trees within a city's limits, specifically street trees, trees on public parklands, and trees on private residences. This "urban forest" contributes significantly to local human and environmental health, economic prosperity, and the overall sustainability of an urban area. Among the most influential physical benefits of urban canopy cover are substantial storage and sequestration of carbon, reduction of air pollution and urban heat islands, interception of stormwater, wildlife habitat, and improvement of aesthetics and property value (Peper, et al., 2007, Mullaney, et al., 2015). There are social and psychological benefits to urban forests as well, improving the perceived safety of an area, alleviating mental stress, and providing social infrastructure for community building (Beyer, et al., 2014, Shanahan, et al. 2015, Beatly, 2017). These benefits of urban forestry quantify the environmental, economic, and social value necessary to ensure proper management, planning and policy decision-making.

Carbon Storage and Sequestration:

Carbon sequestration for urban forests can be defined as the amount of carbon annually removed from the atmosphere and stored within the biomass of trees. With the gradual increase of carbon emissions globally, urban trees will have a critical role in removing these harmful chemicals from our cities, improving the health and longevity of these environments. Urban forests in the United States are estimated to have stored 700 million metric tons of carbon at an annual rate of about 22.8 million metric tons. (Nowak & Crane, 2002)

Air Pollution and Heat Island Reduction:

As urban areas grow, so does their potential for increased pollutants. Poor air quality is known to be harmful to human and environmental health. Urban canopy cover can drastically improve air quality through the direct removal of airborne pollutants such as ozone, sulfur dioxide, nitrogen dioxide, and carbon monoxide (Nowak & Crane, 2002). This removal has implications beyond health improvements. Increased urban canopy cover reduces energy consumption in buildings, which consequently reduces air pollutant emissions from power plants and other sources (Nowak, Appleton, Ellis, & Greenfield, 2017). Urban areas are additionally experiencing severe heat island effects, whereby a built area is hotter than its peripheral rural areas, consequently increasing summertime peak energy demand, air conditioning costs, air pollution, greenhouse gas emissions, heat-related illness, and mortality, and negatively impacting water quality (US Environmental Protection Agency, 2019). Urban canopy cover can significantly reduce these negative externalities by providing shade and through evapotranspiration, effectively cooling surface and air temperatures (Nowak, Hirabayashi, Bodine, & Greenfield, 2014).

Stormwater Mitigation:

Vegetation intercepts rainfall and runoff during heavy rainfall events and can improve the resilience and safety of an urban area. The monetary value of this natural infrastructure in protecting a neighborhood from flooding or water damage far exceeds any built system. This does not only aid in protecting from storm events, but also helps to filter runoff before it enters local waterbodies, benefiting water quality, habitat values, and human water uses.

Increased Property Value:

With the percentage of the world's population expected to live in cities by 2050 nearing 70% (United Nations, 2018), conserving and prioritizing the natural environments of urban settings will be crucial. Property value is known to increase with proximity to parks and greenspace, as does the number of trees per lot, so maintaining and improving urban forests will serve to both increase property value as well as environmental integrity (Beatly, 2017).

Individual and Social Benefits:

Trees in an urban setting have profoundly positive social and health implications, ranging from reduced crime to alleviation of stress and overall happiness. There has been significant research on how more frequent contact with nature improves mental and physical health, is positively correlated with decreased crime and increased perceived safety of an area, and promotes general happiness of urban residence (Beatly, 2017).

Urban Canopy Cover in Poughkeepsie:

Dutchess County planning recently conducted a survey gauging the City's canopy cover at 30% (Wills, 2017). Map 5.3 illustrates that the tree canopy is highly concentrated in parks and preserve areas, and south of the Main Street corridor. Interestingly, there are parks and open spaces that currently do not have canopy cover, signifying the potential of the areas for future tree plantings. Trees provide the city with considerable benefits that can be amplified with awareness, maintenance, and improvement of the existing canopy. Urban canopy cover remains a vital but primarily unrecognized part of the urban ecosystem, especially for Poughkeepsie as it continues to develop.

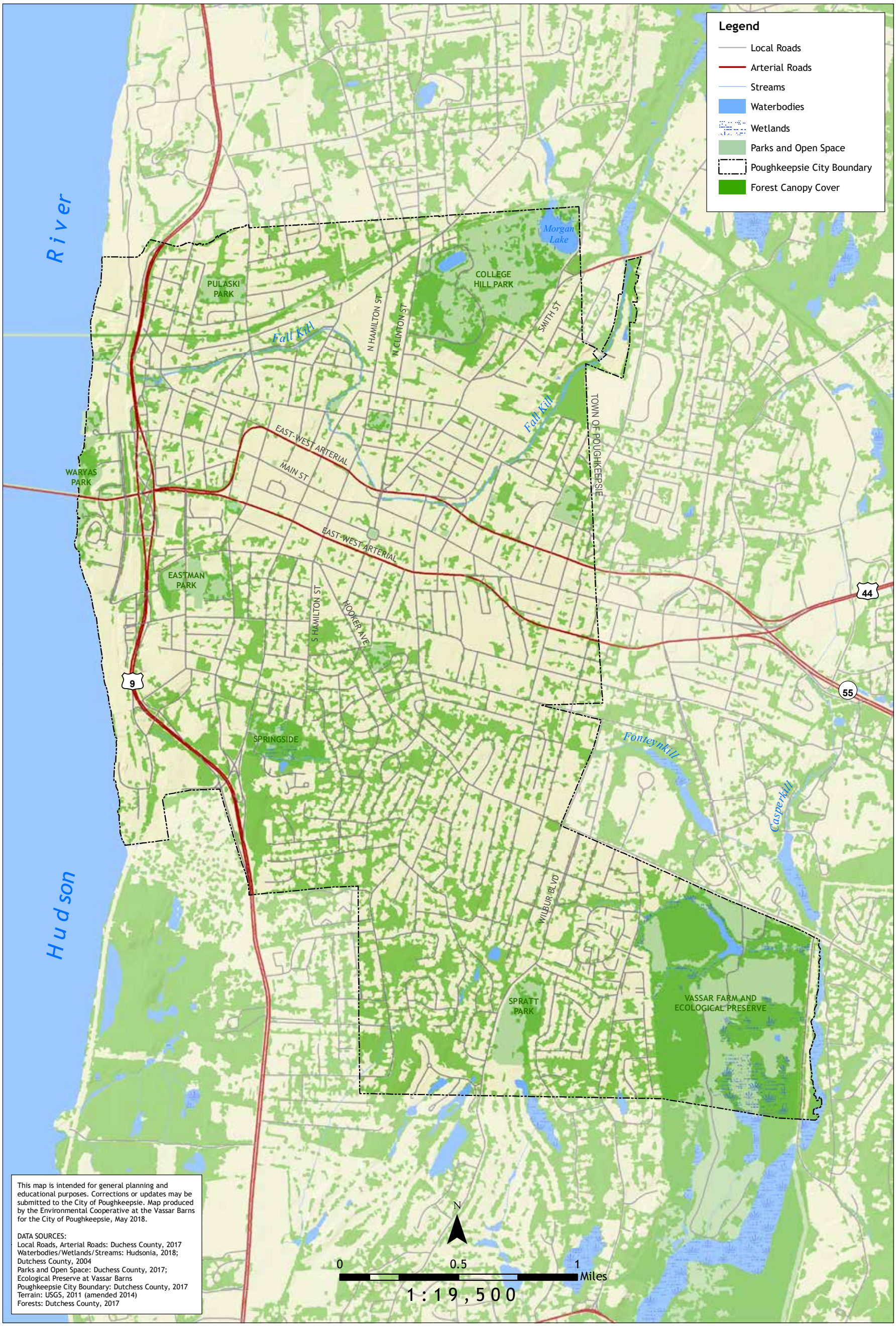
Quantifying and protecting this resource and its myriad of environmental, social, individual, and economic assets will be critical to the future of Poughkeepsie's development and sustainable urban-nature balance. Tools such as i-Tree, a software that provides urban and rural forestry analysis and benefits assessment, can help the City understand the importance of urban canopy cover (USDA Forest Service, 2019).

The i-Tree software randomly selects points in a provided area in a Google Maps Aerial image to be determined either as tree canopy or not. These data are then compiled to produce a percentage of canopy cover for that specific area. Information about stormwater drainage, carbon sequestration, and heat reduction can then be calculated to help understand the benefit of the City's network of trees.

Map 5.3 Canopy Cover in the City of Poughkeepsie

Canopy Cover

City of Poughkeepsie, New York



This map is intended for general planning and educational purposes. Corrections or updates may be submitted to the City of Poughkeepsie. Map produced by the Environmental Cooperative at the Vassar Barns for the City of Poughkeepsie, May 2018.

DATA SOURCES:
Local Roads, Arterial Roads: Duchess County, 2017
Waterbodies/Wetlands/Streams: Hudsonia, 2018; Dutchess County, 2004
Parks and Open Space: Duchess County, 2017; Ecological Preserve at Vassar Barns
Poughkeepsie City Boundary: Dutchess County, 2017
Terrain: USGS, 2011 (amended 2014)
Forests: Dutchess County, 2017

Street Trees

The City of Poughkeepsie Shade Tree Commission was established in 1978 to oversee the planting and care of public street trees in the City of Poughkeepsie (City of Poughkeepsie, 2019). According to a 2006 street tree inventory commissioned by the Committee and conducted by Urban Forestry, LLC (Pleninger, 2006), there are 84 species of trees throughout the City, with a total of 6,987 individual street trees. Visualizing the locations and distributions of street trees is an important component of urban planning. The trees are displayed as points on Map 5.4 with no symbolic distinction between species (see Table 5.4 for individual species populations). It should also be noted that these points are based on the address of the property they are associated with, not their actual physical position. In other words, these points have not been "ground-truthed" in the field, and as such the location of these points on the map may be slightly different than the actual location of the trees. Moreover, many trees may have been removed or planted in the last decade since the 2006 inventory was created. Currently, the City of Poughkeepsie is in the process of updating the street tree inventory (City of Poughkeepsie, 2018).

i-Tree in Poughkeepsie – Future Analysis

A worthwhile future project for the City of Poughkeepsie would be to use i-Tree to analyze the current canopy cover. This would dovetail nicely with the current City tree inventory that focuses on street and park trees. To accurately analyze canopy cover of all trees in the City of Poughkeepsie we suggest plotting enough points in i-Tree to sufficiently account for the average parcel size and total number of parcels in city limits, resulting in about 11,500 points. i-Tree is simple to use and we feel this is a feasible goal if ample time can be devoted to it, perhaps through the help of local college interns. This analysis would provide a real world reference for understanding the presence and frequency of canopy cover in the urban environment to inform management of the urban forest. www.itreetools.org

Table 5.4 Number of Street Trees Per Species (2006 Data)

Tree Species	Population
Acer platanoides (Norway Maple)	2,370
Malus species (Crabapple species)	753
Cercis canadensis (Eastern Redbud)	433
Prunus serrulata (Kwanzan Cherry)	383
Fraxinus pennsylvanica (Green Ash)	341
Gleditsia triacanthos (Honeylocust)	320
Quercus palustris (Pin Oak)	236
Pyrus calleryana (Bradford Pear Cultivars)	235
Tilia cordata (Littleleaf Linden)	217
Acer platanoides (Crimson King)	147
Acer rubrum (Red Maple)	125
Quercus rubra (Red Oak)	108
Acer saccharum (Sugar Maple)	106
Platanus x acerifolia (London Planetree)	102
Syringa reticulata (Japanese Tree Lilac)	72
Acer saccharinum (Silver Maple)	68
Crataegus species (Hawthorn species)	66
Ginkgo biloba (Gingko)	51
Pinus strobus (Eastern White Pine)	48
Prunus species (Cherry Plum species)	46
Acer ginnala (Amur Maple)	43
Fraxinus americana (White Ash)	42
Robinia pseudoacacia (Black Locust)	40
Ulmus americana (American Elm)	38
Picea pungens (Blue Spruce)	35
Acer campestre (Hedge Maple)	33
Acer platanoides Schwedleri	32
Platanus occidentalis (Sycamore)	29
Pyrus species (Pear species)	26
Prunus cerasifera (Purple Leaf Plum)	25
Picea abies (Norway Spruce)	24
Sophora japonica (Japanese Pagoda Tree)	24
Koelreuteria paniculata (Golden Raintree)	20

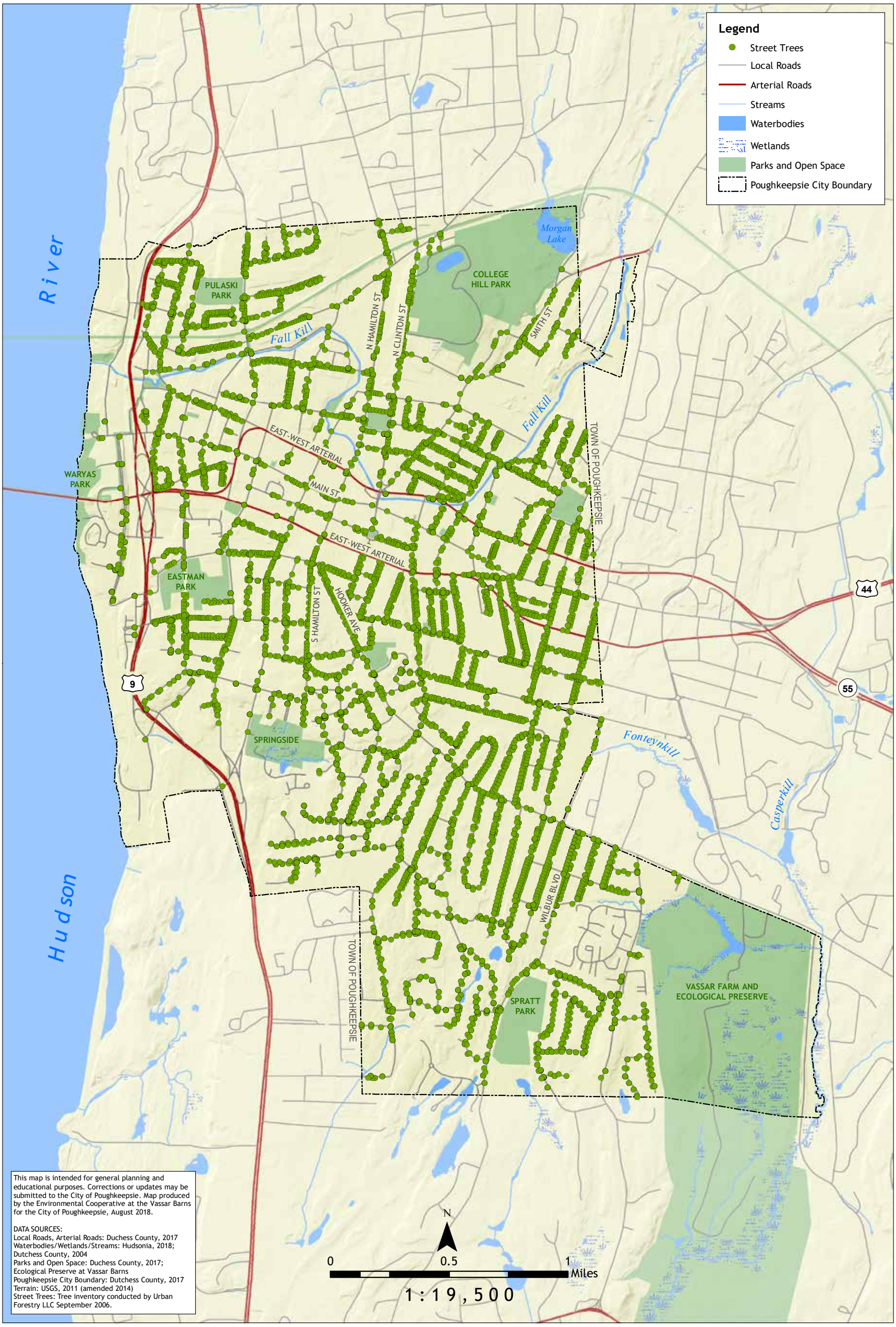
Pinus nigra (Austrian pine)	20
Populus deltoides (Cottonwood)	19
Morus alba (White Mulberry)	18
Crataegus phaenopyrum (Washington Hawthorn)	16
Pseudotsuga menziesii (Douglas Fir)	16
Ulmus pumila (Siberian Elm)	16
Juniperus virginiana (Eastern Red Cedar)	15
Ailanthus altissima (Tree of Heaven)	13
Zelkova serrata (Japanese Zelkova)	13
Acer hippocastanum (Horsechestnut)	12
Liquidambar styraciflua (American Sweetgum)	12
Phellodendron amurense (Amur Corktree)	12
Acer palmatum (Japanese Maple)	11
Cornus florida (Flowering Dogwood)	10
Carpinus betulus (European Hornbeam)	9
Malus sylvestris (Common Apple)	9
Prunus serotina (Black Cherry)	9
Catalpa speciosa (Northern Catalpa)	8
Picea glauca (White Spruce)	8
Quercus alba (White Oak)	8
Tsuga canadensis (Eastern Hemlock)	8
Juglans nigra (Black Walnut)	7
Acer negundo (Boxelder)	6
Acer pseudoplatanus (Sycamore Maple)	6
Fagus sylvatica (European Beech)	6
Prunus x yedoensis (Yoshino Cherry)	6
Betula pendula (European White Birch)	5
Carya ovata (Shagbark Hickory)	4
Magnolia species	4
Quercus macrocarpa (Bur Oak)	4
Cercidiphyllum japonicum (Katsura)	3
Cladrastis kentukea (Yellowwood)	3
Cornus kousa (Kousa Dogwood)	3
Rhamnus cathartica (Buckthorn)	3

Sorbus aucuparia (European Mountain Ash)	3
Tilia americana (Basswood)	3
Carya glabra (Pignut Hickory)	2
Castanea mollissima (Chinese Chestnut)	2
Celtis occidentalis (Hackberry)	2
Liriodendron tulipifera (Tuliptree)	2
Salix species (Willow species)	2
Thuja occidentalis (Eastern Arborvitae)	2
Cornus mas (Cornelian Cherry Dogwood)	1
Cotinus purpurea (Smoke Tree)	1
Ilex opaca (American Elm)	1
Larix decidua (Common Larch)	1
Prunus persica (Common Peach)	1
Prunus virginiana (Common Chokecherry)	1
Quercus coccinea (Scarlet Oak)	1
Quercus velutina (Black Oak)	1
Taxus species (Yew species)	1
TOTAL	6,987

Map 5.4 Street trees in the City of Poughkeepsie based on the 2006 tree inventory

Street Trees

City of Poughkeepsie, New York



Ash Trees and the Emerald Ash Borer

The emerald ash borer (EAB) is an invasive beetle first discovered in Michigan in 2002 after arriving in wooden packing material from Asia. It was first seen in New York State in 2009. The Emerald Ash Borer has become established in the Mid-Hudson Valley in recent years, and once a tree is infested with the insect it dies within 2-4 years (NYS Department of Environmental Conservation, 2019). The insect is well established among ash populations in Dutchess County, posing a serious threat to Poughkeepsie's ash tree population. Map 5.5 is the result of a 2017 survey of the City's street ash tree population, undertaken to assess the current impact of EAB on City trees. The map is based on data from the Shade Tree Commission's 2006 street tree inventory. Ash tree locations were identified from the 2006 tree inventory and each location was ground-truthed in the field, and points removed or added as needed. A total of 387 trees were assessed in the field.

In the summer of 2017, over half of the 387 ash trees in the City were symptomatic for EAB infestation (Figure 5.1). Symptomatic trees were defined as those displaying any combination of crown dieback, epicormic branching (branching at the base of the trunk), blonding (absence of outer bark due to woodpecker activity), and/or vertical bark splitting. 35 individual ash trees could be definitively diagnosed with EAB infestation, indicated by the presence of distinct d-shaped exit holes and s-shaped galleries underneath the bark. About a third of the ash trees surveyed displayed no noticeable symptoms of EAB or stress, and were thus designated "asymptomatic". The City has since developed a website to disseminate information about EAB to residents (http://cityofpoughkeepsie.com/shade-tree-commission/eab). A detailed report and management proposal for ash trees was also provided to the City of Poughkeepsie (Appendix B).

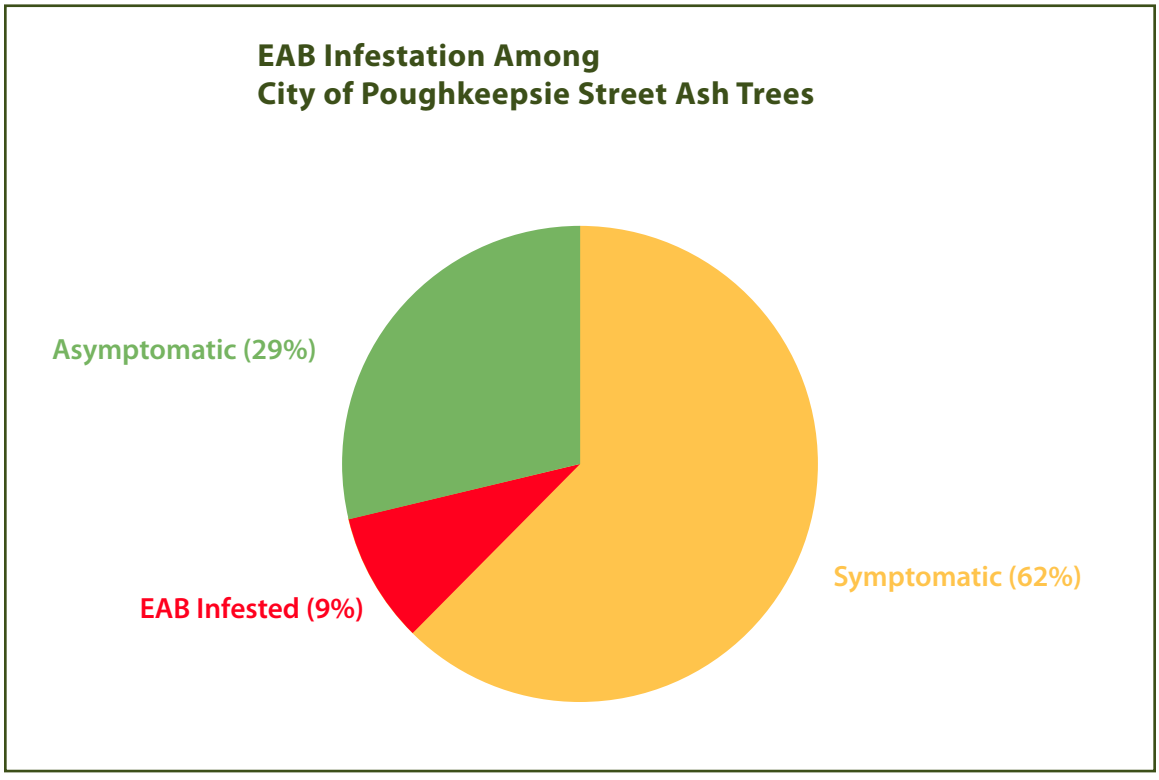


Figure 5.1 Percentage of ash trees along streets in the City of Poughkeepsie that were identified with signs of the Emerald Ash Borer, based on the 2017 survey.

EAB will likely kill most, if not all of the City of Poughkeepsie's ash trees, both public and private, within the next few years. Because infested street trees were found at disparate locations throughout the city, rather than concentrated in one cluster or core of infestation, it will most likely be impossible to prevent EAB from spreading to non-infested ash trees across the city. The high numbers of symptomatic ash trees indicate that most of the City's ash are stressed if not already colonized by EAB, and are therefore more vulnerable to infestation. While it is generally considered too late to save most of Poughkeepsie's street ash trees, the following steps can be taken in response to EAB:

- Selected healthy, young (but mature), seed-bearing street trees may be treated with pesticides to ward off their infestation by EAB.
- EAB-infested street ash trees may be removed in a phased process: dead trees removed first, symptomatic trees closely monitored in successive years and removed accordingly, etc.
- Removed trees should be replaced as soon as possible with appropriate species, i.e., those that have comparable acid and pollutant tolerance, size, and canopy cover as ash trees.
- Private homeowners may assume responsibility for their own private ash trees, choosing to treat or remove depending on their financial and time resources.

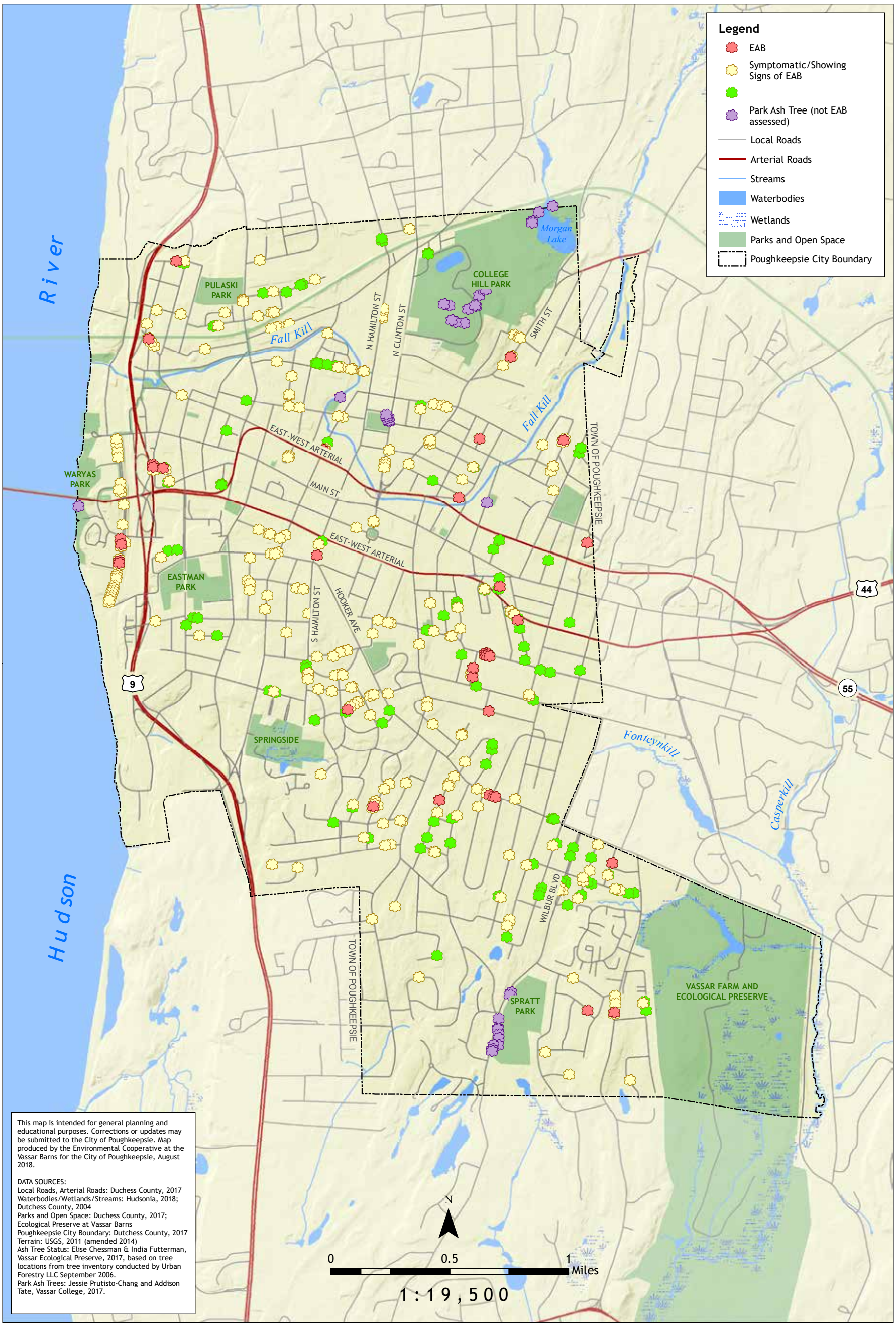
Please see Appendix B for the full EAB Management Plan, including costs of pesticide treatments and removal, information on pesticides, and recommended replacement street trees.

The results of this survey indicate that EAB infestation is well underway in Poughkeepsie. Over half of Poughkeepsie's ash trees display clear symptoms of stress, while 9% are definitely infested. This percentage will only increase in the coming years, likely leading to the demise of the City's entire ash population. Ash trees are being carefully monitored and removed when necessary. Replacement trees should contribute to the urban forest diversity of Poughkeepsie in the event that another invasive pest should arrive and target another tree species.

Map 5.5 Ash Trees in Poughkeepsie that are impacted by the Emerald Ash Borer

Ash Trees and Emerald Ash Borer (EAB) Status

City of Poughkeepsie, New York



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